

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated September 18, 2008. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 50-51, 55 and 57-58 are under consideration in this application. Claims 22-39, 48-49, 52 and 56 are being cancelled without prejudice or disclaimer. Claims 50-51 are being amended, as set forth in the above marked-up presentation of the claim amendments, in order to correct formal errors and/or to more particularly define and distinctly claim Applicants' invention. All the amendments to the claims are directed to the elected Group I (a method of forming a step-terrace structure on a SiC surface) and supported by the specification. Applicants hereby submit that no new matter or new issue is being introduced into the application through the submission of this response.

Formality Rejection

Claims 25 and 36 were objected to for informalities. Since claims 25 and 36 are being cancelled without prejudice or disclaimer, the objection becomes moot.

Prior Art Rejections

Claims 22-23, 25-26, 50-51, and 55-58 under 35 U.S.C. §103(a) were rejected as being unpatentable over Powell et al. (U.S. Pat. No. 6,165,874) in view of Semond et al. (WO 01/95380 A1) and the newly cited Li et al. ("Field-ion scanning tunneling microscopy study of the atomic structure of 6H-SiC (001) surface cleaned by in situ Si molecular beam etching"), Claim 24 was rejected further in view of Forbes et al. (U.S. Pub. No. 2004/0164341 A1), and Claim 52 was rejected further in view of Kitabatake (U.S. Pub. No. 2001/0015170 A1). These rejections have been carefully considered, but are most respectfully traversed.

Claim 51

The crystal growing method of claim 51 includes the steps of: forming a step-terrace structure that is flat at an atomic level on a SiC surface and then removing an oxide film,

which is naturally formed thereon and covers the step-terrace structure, from the surface; after the forming and then removing step, performing at least one cycle of a process including irradiating Si or Ga atomic beam on the surface and then heating the irradiated surface thereby separating said Ga or Si from the irradiated surface and removing oxygen on the surface; and after the performing step, growing a Group-III nitride 7 on the surface. The Group-III nitride contains Al. The step of growing a Group-III nitride is conducted under high vacuum and comprises the steps of: step-flow-feeding Ga or In as a surface controlling element thereby controlling the mode of crystal growth as layer-by-layer of the Group-III nitride on said SiC surface, and each layer of the Group-III nitride consisting of fused two-dimensional nuclei of the Group-III nitride (p. 7-8; p. 11, last para.; p. 12, 2nd para.; p. 14, 2nd para.); and then feeding a Group III element and nitrogen, followed by the termination of the feeding of said surface controlling element.

The present invention grows two-dimensional nuclei of AlN which then are fused laterally in layers. The present invention provides the layer-by-layer growth with each layer consisting of fused two-dimensional nuclei, instead of the growth of the AlN layer in the form of individual three-dimensional islands in the prior art.

Powell (col. 14, lines 15-45; col. 17, lines 50-67) was relied upon by the Examiner (p. 5, 1st para. of the outstanding Office Action) to teach the layer-by-layer growth. However, Powell specifically teaches away from the present invention by deliberately “suppressing two-dimensional nucleation (col. 14, lines 38-39; claim 1, etc.).” In particular, Powell sets a growth rate due to step-flow growth to be at least one hundred (100) times greater than the growth rate due to growth involving two-dimensional nucleation (col. 14, lines 23-26), to *suppress* (rather than “*promote*”) two-dimensional nucleation. The other cited references fail to compensate for Powell’s deficiencies.

Claim 50

The crystal growing method of claim 50 includes the steps of: forming a step-terrace structure (for example, the embodiment depicted in Figs. 1-3) on said SiC surface 2; removing an oxide film which is naturally formed on said surface in an atmosphere of reduced oxygen partial pressure and covers the step-terrace structure; after the removing step, performing at least one cycle of a process including irradiating Si or Ga atomic beam 5 on the surface 3 and then heating the irradiated surface thereby separating said Ga or Si from the irradiated surface and removing oxygen on the surface to provide a flat and clean SiC surface; and after the performing step, growing a Group-III nitride on the surface without said

Ga or Si left in-between while the step-terrace structure is maintained, by adjusting a pre-feeding time of a Group-III element thereby preventing excess aggregation of lack of the Group-III element (p. 15, last para.), feeding the Group III element and feeding nitrogen after the Group III element has been fed.

The present invention, adjusts the timing of preceding irradiation of Al so as to prevent the deterioration of crystallinity due to the aggregation of Al by excess Al irradiation, or the formation of a SiN film due to the lack of Al irradiation. The cited references are simply silent regarding such a step of “adjusting a pre-feeding time of a Group-III element thereby preventing excess aggregation of lack of the Group-III element” as in the present invention.

Applicants contend that neither the cited references, nor their combinations teaches or suggests each and every feature of the present invention as recited in independent claims 50-51. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is thus respectfully solicited.

Conclusion

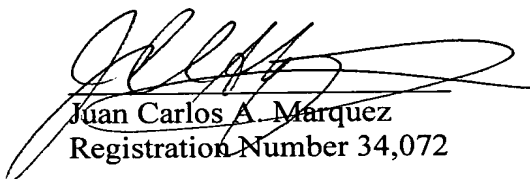
In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance

of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and telephone number indicated below.

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